WORKING paper

BANQUE DE FRANCE
EUROSYSTÈME

# Bank Local Specialization

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February 2022, WP #865

## ABSTRACT

Using micro-data on bank-SME relationships in France, we show that banks specialize locally by industry and that this specialization shapes the equilibrium amount of lending. We use the reallocation of firms' accounts from closed branches to nearby branches of the same bank, as a source of quasi-random variation in the match between a firm's industry and the industry of specialization of its bank. Reallocation is associated with a significant and persistent drop in credit, the magnitude of which doubles for firms transferred to a branch less specialized in their industry.

Keywords: Bank Specialization, SMEs, Relationship Banking, Branch Closures.

Classification JEL: G21.

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# NON-TECHNICAL SUMMARY

This paper explores whether banks gain market power through differentiation and specialization and the implications of such a credit market segmentation for small firms' access to credit. This question is of first order importance to assess competition in the banking market. Lenders that may appear to compete fiercely in an undifferentiated credit market, may in fact enjoy market power in some market segments by tailoring their products and services to particular clients or industries. While the banking literature has extensively analyzed the market power banks gain thanks to the private information gathered through the lending interaction with small borrowers (e.g. Rajan 1992; Berger and Udell 1995), we want to characterize the complementary role of the industry segmentation of the small-firm credit market. As illustrated in the figure below, aggregate concentration measures (lhs) indeed depart from credit concentrations calculated industry-by-industry (rhs), showing that credit markets are segmented by industry.

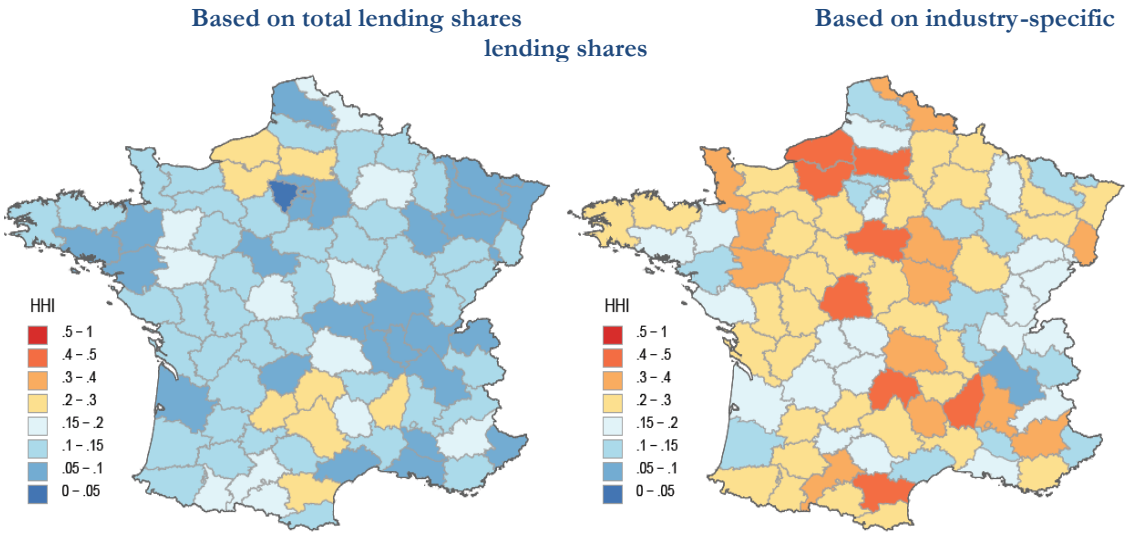
We use unique regulatory data for the universe of bank-firm relationships in France, from 2010 to 2017, to construct measures of bank-branch industry specialization in narrowly defined geographical credit markets. We identify banks' sector of specialization using abnormally large portfolio shares. Industry specialization appears in the data as a widespread but local, branch-level, phenomenon. More than a third of bank branches in France come out as being specialized in supplying credit to small firms in at least one specific industry but different branches of the same bank generally exhibit different industrial specializations.

Next, we turn to examining whether firm's elasticity of credit substitution across banks is smaller when specialized banks offer differentiated services. For example, a firm in the construction industry will find more difficult or costly to substitute credit obtained from a bank that is specialized in the construction industry than credit obtained from a generalist bank. Our empirical research design exploits borrower reallocations across branches due to some 700 branch closures from 2010 to 2017. Branch closures did not end bank-borrower relationships: all accounts were transferred to nearby branches of the same bank effectively inducing plausibly exogenous variation in the match between the borrower's industry and the industry of specialization of the branch.

We find evidence of a significant drop in the total of credit granted by a bank to a small firm whenever the firm's account is reallocated to a new branch. Total credit drops by 12% on average over the three years following the closing. Part of this decline is substituted with more credit from other banks. However, the average firm's total credit drops permanently by about 4% after reallocation, relative to other firms in the same area and industry.

We then document the heterogeneity of this decline in equilibrium credit by the match between the borrower's industry and the industry of specialization of the closing and absorbing branches. We find that the magnitude of the decline in credit doubles when a firm's accounts are reallocated from a branch that specializes in its industry to a branch that does not. We show that this effect cannot be attributed to the change in distance or in competition associated with the closing, as well as the loss of a long lending relationship. The results are strongly suggestive of a segmented bank credit market, where bank specialization by industry increases the cost of substituting bank sources of financing for small firms.

**Credit market concentration at urban unit level : Herfindahl index (2016 Q4)**




Notes: The figure plots, for each urban unit, two different measures of credit market concentration. The first Herfindahl Index (left panel) is the standard concentration measure, calculated using total lending shares within each unit. The second (right panel) is the (credit) weighted average of industry-specific credit market concentrations within each unit, which therefore accounts for market segmentation. Data as of December 2016.

# Spécialisation bancaire et financement local des PME

## RÉSUMÉ

À partir de données microéconomiques caractérisant les relations banques-PME en France, nous montrons que les banques se spécialisent par secteur d'activité, au niveau local. Cette spécialisation affecte la quantité de crédit distribuée. Nous utilisons les fermetures d'agences bancaires et les transferts de comptes qui en résultent vers des agences voisines (au sein de la même banque) comme source de variation quasi-aléatoire dans la correspondance entre le secteur d'activité d'une entreprise et celui dans lequel sa banque est spécialisée. Le transfert est associé à une baisse significative et persistante du crédit, dont l'ampleur est multipliée par deux pour les entreprises transférées dans une agence bancaire moins spécialisée dans leur secteur d'activité.

Mots-clés : spécialisation bancaire, PME, relations bancaires, fermetures bancaires.

# 1 Introduction

Widespread bank branch closures and consolidation in Europe and the United States after the Great Recession have renewed a longstanding policy and academic debate about the nature and implications of bank market power. A vast body of theoretical and empirical work, following Rajan (1992), has explored one source of such market power: the informational monopoly gained through relationship lending. Less studied, and of potentially equal importance, is the market power gained through differentiation and specialization. Lenders that may appear to compete fiercely in an undifferentiated credit market, may in fact enjoy market power in some market segments by tailoring their products and services to particular clients, industries, or types of financing. Such credit market segmentation may have first order implications for the access to credit by small and opaque bank-dependent firms as well as its cost. Documenting the extent to which banks specialize in a segmented small business credit market, and assessing whether specialization confers market power, poses important data and identification challenges that we address in this paper.

We use unique regulatory data that contains, for the universe of bank-firm relationships in France, the identity and location of the bank branch providing credit. With these data we construct measures of bank and bank-branch industry specialization in narrowly defined geographical credit markets. Figure 1 provides stylized motivating evidence for our study. It plots two different measures of credit market concentration by urban unit.[1] The left panel shows the standard concentration measure, calculated using total lending shares. The right panel shows the average of credit concentrations calculated industry-by-industry, which takes into account market segmentation. The difference between these two measures will be larger when the credit market is segmented by industry (e.g., the two measures will be identical if all bank loan portfolios have the same industry composition). Indeed,

[1] An urban unit is defined as a municipality or a group of municipalities which covers a continuously built up zone (with no more than 200 meters between two constructions) and hosts at least 2,000 inhabitants.

the fraction of urban units with a very high concentration level (HHI>0.4) raises from from 21% when measured in the traditional manner, to 49% when measured taking into account credit segmentation by industry (see Table A.3 for more details). This pattern is consistent with heavy industry segmentation in the small business bank credit market.

The main goal of our empirical analysis is to explore the implications of credit market segmentation for small firms' access to credit. Our working hypothesis is that a firm's credit elasticity of substitution across banks is smaller when specialized banks offer differentiated services. For example, a firm in the construction industry will find more difficult or costly to substitute credit obtained from the bank (or branch) that is specialized in the construction industry than credit obtained from a generalist bank (or branch). A necessary first step is to evaluate the relevant unit of analysis to study specialization. In other words, do banks specialize by industry as a whole? Or is specialization a local, branch-level, phenomenon?

To answer this question we follow the data driven approach developed in Paravisini et al. (2017) to identify banks' sector of specialization using abnormally large portfolio shares. The intuition of the measure is best explained through an example. Suppose 20% of bank credit in an urban area goes to the construction industry and is serviced by five banks. Banks are heterogeneous: while four banks allocate less than 10% of their loan portfolio to construction, the fifth bank allocates more than 40% of its credit portfolio to the sector. This fifth bank would be identified as a specialist in the construction industry for this urban area. The advantage of using portfolio shares to detect specialist banks is that the identification of the specialization sector is unaffected by the size of the sector or by the market share of each bank in any given location.

Two key stylized facts emerge from this exercise: bank branches tend to specialize by industry, but different branches of the same bank generally exhibit different industrial specializations. More than a third of bank branches in France come out as being specialized in supplying credit to small firms in at least one specific broad

industry. Most urban areas include specialized bank branches. Moreover, we observe that most industries exhibit specialized bank branches at the local level. For instance, some 9% of the bank branches present in our sample in 2017 are specialized in funding transportation and storage activities. Overall, this implies that a French SME has a non-negligible probability to get connected to a branch that is specialized in its type of business. When we investigate specialization patterns of the branches within banks, we find that large banks are characterized by a large share of specialized branches (40% for the average bank with more than 10 branches). However, within a bank, different branches tend to be specialized in different industries. In short, industry specialization appears in the data as a widespread but local, branch-level, phenomenon.

Motivated by these stylized facts we turn to measuring the heterogeneity in firm's elasticity of credit substitution by branch specialization. Our empirical research design exploits borrower reallocations across branches due to branch closures. Among bank branches active in SME lending, some 700 branches were closed during our sample period (between 2010 and 2017) throughout the country, due to internal restructuring plans of the main banks' retail activities. Branch closures did not end bank-borrower relationships: all loan accounts in a closing branch were transferred to larger nearby branches of the same bank. Branch reallocation induced variation in the match between the borrower's industry and the industry of specialization of the branch that we exploit to measure the heterogeneity in the elasticity of credit substitution. In the construction firm example above, when branch services are segmented by industry, the transfer of the firm's account to a generalist branch should reduce the equilibrium amount of credit used by the firm, relative to a counterfactual in which the account were transferred to another branch that is also specialized in the construction industry. Branch closures occurred in large waves, and the identity of the closing and absorbing branches were selected by headquarters according to criteria like local bank density, arguably unrelated to the demand for credit of individual firms. The very disaggregated nature of the data also allows using saturated

specifications to control for local shocks at the urban unit level, bank shocks, and firm shocks that may occur concurrently with the branch closure.

In the baseline specification we find evidence of a significant drop in the total of credit granted by a bank to a small firm whenever the firm's account is reallocated to a new branch. Including undrawn credit lines, total credit drops by 12% on average over the three years following the effective closing. Part of this decline is substituted with more credit from other banks. However, the average firm's total credit drops permanently by about 4% after an account reallocation, relative to other firms in the same narrow geographical market and industry. We then document the heterogeneity of this decline in equilibrium credit by the match between the borrower's industry and the industry of specialization of the closing and absorbing branches. We find that the magnitude of the decline in credit doubles when a firm's accounts are reallocated from a branch that specializes in its industry to a branch that does not. The magnitude of this estimated effect is robust to controlling for the change in distance associated with the branch closing as well as for the loss of a long lending relationship. The results are strongly suggestive of a segmented bank credit market, where bank specialization by industry increases the cost of substituting bank sources of financing for small firms.

**Related Literature.** The results in this paper complement an extensive literature on relationship lending to small firms (for surveys see, e.g., Boot (2000); Ongena and Smith (2000); Degryse et al. (2009)). This literature analyzes the market power banks gain thanks to the private information gathered through the lending interaction with small and opaque borrowers.[2] We extend this literature by characterizing the complementary role of the industry segmentation of the small-firm credit market.

Our results also represent a novel contribution to the nascent literature studying the extent and consequences of bank specialization in corporate lending. Studies

[2]See, for example, Sharpe (1990); Rajan (1992); Berger and Udell (1995, 2002); Agarwal and Hauswald (2010); Ioannidou and Ongena (2010); Degryse and Ongena (2005); Drexler and Schoar (2014); Petersen and Rajan (1994); Nguyen (2019))

that incorporate specialization and segmentation in the analysis of bank competition in the market for corporate credit is scarce, a stark contrast to its widespread adoption in the study of consumer banking services, such as mortgages (e.g., Benetton (2020)), pensions (e.g., Hastings et al. (2017)), and deposits (e.g., Egan et al. (2017)), amongts others. Of the existing work on bank specialization, the closest to ours is Paravisini et al. (2017), which shows that lenders specialize by export destination market in the context of Peruvian exporters.[3] Our contribution is twofold. First, we show that the effect on competition of market segmentation through differentiation is of first order magnitude for small opaque firms. And second, we uncover and document the local and decentralized nature of specialization within large banks.

These findings combined imply that the true extent of market power, segmentation, and specialization in the bank credit market for small firms can be obscured by aggregate or bank-level data. Also, the results have important implications for the consequences of bank branch consolidation, which motivates this paper. The mechanism uncovered here is related to, but economically distinct from, the role played by physical distance and emphasized by existing work (e.g., Nguyen (2019)). In very related work, Bonfim et al. (2016) document that loan conditions change when firms switch to a new bank following to closure. Our results highlight that branch closures affect the credit relationship even when borrowers remain with the same lender, through local bank acquisition.

The remainder of this paper is organized as follows. Section 2 describes the spread of French banking networks and institutional details about branch closures. Section 3 describes the data used in our analysis. In Section 4, we present our

[3]Two other recent studies that incidentally point to a potential role for banks' industry specialization are Ongena and Yu (2017), which finds that multi-industry firms tend to borrow from a larger number of banks, and that they tend to pick up banks according to their industry specialization, and De Jonghe et al. (2019), which finds that Belgian banks hit by the Lehman shock tend to shore up borrowers in industries where the bank is dominant and industries where it is specialized. In addition, Goedde-Menke and Ingermann (2020) find that lower specialization - defined as a higher diversification of loan officers' portfolio - following a downsizing in the bank staff of a German bank, translates into higher risk taking in the intensive margin.

measure of bank branch specialization and provide descriptive statistics of this new variable. Section 5 describes our empirical strategy and section 6 details the results of our analysis. Last, Section 7 concludes.

## 2 Bank branch networks in France

With close to 50 branches per 100,000 inhabitants in 2020 (ECB structural financial indicators), France has one of the highest density of bank branches among euro area countries.[4] Bank branches are geographically widespread throughout the country, leaving almost no room for so-called banking deserts, even though of course the largest urban areas concentrate a larger number of bank branches. As an illustration, the left panel of Figure 2 shows the spatial distribution of branches lending to SMEs as of December 2016. However, in the past couple of years, major French banks have announced plans to reduce their branch network by 2020 as customers are walking into their bank less often than before. These plans confirm and accelerate a trend that started with the financial crisis in the late 2000s, against the backdrop of a concomitant rise of online banking. In aggregate, the overall number of bank branches, lending to both households and firms in France, has declined by 4%, from 38,784 branches in 2010 to 37,261 in December 2016.[5]

Among these branches, some only lend to corporate clients, some only serve households and others serve both. In this paper, we focus on branches that distribute credit to small and medium-size enterprises (SMEs).[6] At the end of 2016, about a third of all bank branches (12,291 branches) were actively lending to SMEs.[7] Among the branch closings registered since 2010, some two thirds happened as

[4]The average number of branches per 100,000 inhabitants is 41 in the eurozone in 2020. Dispersion across countries is wide with 5 countries having less than 20 whereas eight have over 40.

[5]Source: ECB structural banking indicators.

[6]We define firm size according to the European definition. SMEs are enterprises with less than 250 workers and a turnover or total assets not exceeding, respectively, 50 million euros and 43 million euros.

[7]This number is based on lending to SMEs - excluding micro-firms and individual entrepreneurs - recorded in the French Central Credit Register (see data section for more details).

the consequence of a merger between two banks. We focus here on the remaining closings, that were not related to bank mergers, so that the post-closing transfer of firm accounts remains always confined within the same initial relationship bank. From 2010 Q1 to 2017 Q3, some 700 branches that were active in local SME lending closed in continental France as a result of internal bank strategies.[8] These closings have been widespread over time and geographically dispersed as illustrated by figures 3 and 4. Figure 3 shows the spatial distribution of all branch closings over the 2010-2017 period. Over our sample period 45% of branch closings took place in small cities (urban units with less than 20,000 inhabitants) and 15% in large cities (more than 100,000 inhabitants).

In practice, when a bank decides to close a branch, the closing announcement takes place 14 to 17 months before the branch officially closes and actually stops operating. Following the closing of the branch where their account is managed, borrowers do not lose access to their bank: they are automatically transferred to another branch within the same bank. They do not get to choose their new branch in the vast majority of cases. On average 90% of firms in our sample get transferred to the absorbing branch while the rest of them may have made their own decision to switch to another entity.

In our analysis of the effects of local bank specialization, we exploit branch closings as events which trigger exogenous variation in the industry specialization of the bank branches to which a given firm is connected.

When they communicate upon closings, e.g., in their annual reports, banks generally motivate the downsizing of their branch network by general developments such as the rise of online banking, and do not refer to local conditions. To gather

[8]Information about closed branches is consistently registered over time for most French banks but not for all of them. The bank needs to follow a permanent account number policy (so called *RIB*) for panel data information to be available about the demography of its branches. The historical information about the extent of a bank's network that is stored by the Banque de France is limited to 14 months unless the bank has opted for a specific account registration framework called "RIB permanent" (permanent bank account identifier), henceforth RIB-p banks. Our sample of branch closings events is thus restricted to such banks for the period 2010- 2014 and exhaustive starting in 2015 as we have started to collect and record information on branch closings on a regular basis at the beginning of 2016.

more direct evidence that closing decisions are independent enough of local economic conditions, we therefore conduct a few preliminary tests.

We first run a standard analysis of variance, whereby we regress a dummy for branch closures (over the period 2010-2017) on various sets of fixed effects. Spatial dummies standing for counties (in French: *départements*) and (much smaller) urban units explain respectively 3% and 8% of the variance of the branch closing dummy.[9] Banking group fixed effects also acount for only a tiny share of variance. In contrast, the bank-level fixed effects explain alone 32%. Overall, this suggests that the decision to close a branch depends more on banks' global strategy rather than on local factors.

Second, we estimate a linear probability model that relates the probability that a branch closes to a set of (i) branch-level variables and (ii) measures of local economic dynamics. The dependent variable is again a dummy equals to 1 if the branch is closed during the 2010-2017 period. Explanatory variables, measured before the period of interest, are the size of the branch (total amount of corporate loans, in log), the branch's market share in the county, a dummy for being the only local branch of the bank, the rank of the branch within the bank (of within the bank $\times$ county) and the county's size and population dynamics (measured as the increase in the number of inhabitants over the period 1990-2006).[10] We find that the probability of a closing decreases when the branch is the sole branch of its bank in the county and increases when the county is more populated and its population is on the rise. These results are consistent with anecdotal evidence in the press that banks close more branches in dynamic cities where the population is younger and keener on using online banking. Branch characteristics, as the branch's market size or its relative size within the bank (its rank), seem not to impinge on the decision to close it. Interestingly, the significance of branch-level variables vanishes whenever we add bank fixed effects in the regression. The low predictive power of these branch-specific variables conditionally on bank fixed-effects provides support

[9] Detailed results are shown in Table A.4 in the online appendix.
[10] Detailed results are shown in Table A.5 in the online appendix.

to our identification strategy.

# 3 Data

## 3.1 Data sources

We merge three different types of information to conduct our empirical analysis: bank-firm credit, bank branch opening and closing dates and geographical data on French municipalities, urban units and urban areas.

First, we get virtually all credit links between domestic bank branches and non-financial firms in France from the French credit register, which records credit available at the branch-firm level above a small reporting threshold of EUR 25,000.[11] A firm is defined here as a registered legal entity. Each firm is identified with a unique legal identifier (SIREN code). Credit available for a borrower is defined as the total of loans, undisbursed credit lines and guarantees given by the bank branch.[12] Some detail is also reported about the outstanding amounts of specific types of loans (notably, leasing, factoring and securitized loans). This information is collected at monthly frequency. To limit the size of our database, we however keep end-of-quarter observations only. Banks are individual credit institutions that have been authorized to operate in France (including branches of foreign banks). They are identified by a 5-digit code (BIC code) and can be part of a banking group. We map banks into their respective consolidating groups (*Groupes economiques d'appartenance*, or GEA) using additional information from the French supervisor. The credit register also includes the ZIP codes of both the borrowing firms and the bank branches, which allows us to compute geographical distances between borrowers and lenders.

[11] The threshold applied at the branch-firm level up to March 2012, and at the (less restrictive) bank-firm level thereafter. We imposed this threshold at the branch-firm level throughout the 2010-2017 period to avoid a statistical break.

[12] Two banks, *La Banque Postale* (the French post bank) and another French cooperative bank, only report credit at the county (*departement*) level, and not at the level of local branches. We drop these two banks from our sample. They accounted for less than 1% of outstanding amounts of loans to SMEs in December 2016.

Second, data on branch closures are obtained from the Banque de France FIB database (*Fichier des Implantations Bancaires*) since 2010. This database collects information on every single bank branch operating in France, including its precise location (ZIP code/street address), its opening date and the BIC number of the parent bank. As regards branch closures, the database records the official date of the closing, the date of the closing announcement, as well as the reason why a branch was closed (merger or acquisition by another bank or internal bank reorganization). In the case of a within-bank closing and a subsequent transfer of accounts, the identity of the absorbing branch, as well as its location, are reported. We drop firms affected by more than one closing event (less than 10% of treated firms).

Last, we gather geographical data for mainland France about some 36.000 municipalities (identified with a ZIP code), 2,000 urban units and 771 urban areas. An urban unit (UU) is a municipality (*commune*) or a group of municipalities that includes on its territory a built-up area of at least 2,000 inhabitants where no dwelling is separated from the nearest one by more than 200 meters. In addition, each municipality has more than half of its population living in this built-up area. The largest geographical unit that we consider in this paper is the urban area (UA). An urban area is defined as a group of municipalities, all in one piece and without enclaves, consisting of an urban pole with more than 10,000 jobs, and rural municipalities or urban units (peri-urban crown) where at least 40% of the resident population with a job works in the pole or in municipalities attracted by it.[13] We compute firm-branch distances with reference to the centroid of the municipalities they are located in. In contrast, we use urban units and urban areas in order to control for geographical dynamics at a broader and more economically relevant level in our empirical analysis.

[13]The urban zoning also distinguishes "medium areas", a group of municipalities consisting of a pole with 5,000 to 10,000 jobs and "small areas", a group of municipalities consisting of a pole with 1,500 to 5,000 jobs

## 3.2 Analysis sample selection

We aim to analyze credit relationships between small and medium-sized businesses (SMEs) and the local branches of their relationship banks.

*Bank sample selection.* We drop all banks for which leasing activities represent more than 95% of their total exposure over the decade 2007-2017. Leasing is a non-standard lending activity that requires specific knowledge and expertise. This specific financial service is most often provided by specialized institutions (in general subsidiaries of larger banking groups) that operate remotely, mostly from Paris. Even though the contract with the leasing company may be sold by the local branch of a deposit-taking bank that belongs to the same group, the issuing branch is recorded in the credit register as being the branch of the leasing institution and not the local bank branch that only acts here as an intermediary. As we aim to study local bank-firm relationships, these leasing institutions do not enter into the scope of this analysis. Additionally, we drop all French public financial institutions (e.g. Groupe CDC, Caisse nationale des autoroutes, BPIFrance etc.). Last, we exclude bank branches located in Corsica and in the French overseas territories (*DOM-COM*). Individual banks are mapped into their respective banking groups (so-called *Groupes Economies d'Appartenance*) using additional information provided by the French supervisor (ACPR).

*Firm sample selection.* We first exclude sole-entrepreneurships so as to focus on corporations. We drop firms that belong to the financial sector, local public administrations, non-resident firms, as well as real estate companies (*SCI*).[14] We consider in our final sample only legal entities belonging to small and medium-sized corporations (SMEs) as defined by the French LME Act of 2008, i.e. firms with less than 250 employees and a turnover below EUR 50 mns (or total assets below 43 mns).[15] However, we exclude micro-enterprises (firms with less than 10 employees

[14] We likewise delete observations for various legal categories under the French civil, commercial or administrative law that are irrelevant for our analysis (eg. parishes, unions, some types of cooperatives, etc.).

[15] The legal definition of an enterprise is the smallest grouping of legal entities that makes up

and an annual turnover below EUR 2 mns) in order to keep the size of our sample manageable. We also drop firms with missing size classification. We focus on firms with at least two banking relationships. Last, we only keep firms that are located in urban units where at least one branch closing occurs and are present at least 8 quarters in a row (2 years) in the credit register.[16] We further impose that treated firms borrow funds from the closing bank branch during at least one quarter in the year preceding the *announcement* of the closure, which takes place by law six quarters before the closure itself.

## 3.3 Descriptive statistics

We conduct our baseline empirical analysis using credit exposure data aggregated at the firm-bank level, while keeping a record of bank branch closures that affect each bilateral relationship in order to construct our treatment variable. Table 1 provides detailed statistics of our firm-bank dataset. Our estimating sample consists in more than 5.2 millions firm-bank-quarter observations, over the period 2010 Q1 to 2017 Q3. We observe on average 346 banks, corresponding to 11,786 bank branches, and 77,640 firms per quarter. The average number of firm-bank relationships in the cross-section is close to 190,000. The average credit relationship involves an outstanding loan amount of some EUR 430,000 (some EUR 530,000 when undrawn credit lines are taken into account), but half of the bilateral bank-firm relationships involve much smaller amounts, below EUR 115,000. The table also confirms that SMEs tend to pick up lenders in a relatively small neighborhood: the median of the distance between a SME and its bank in our dataset is only 14 km.[17] In Table 2, we also show firm-level statistics for our sample of multi-bank SMEs. The outstanding

a coherent production unit of goods or services and enjoys some minimal degree of management autonomy.

[16]This means that the total of all loans (including short and long term credit, credit-lines, overdrafts, account receivables, export credit, and leasing and factoring) and bank guarantees received by the firm from all selected banks is non-zero during a period of at least to years.

[17]The distance to the bank is computed as the unweighted average of the distances to all the banks' branches the firm borrows from.

bank debt of the average firm is EUR 1 million, which confirms that most of the firms in our sample are rather small. The average total amount of credit available to a firm, including undrawn credit lines, is slightly larger (EUR 1.2 million) and the average ratio of long-term credit to drawn credit is 50% (where long-term credit refers to credit with initial maturity over one year).

# 4 Local bank specialization

## 4.1 Measuring local bank specialization

In this section, we detail how we define and compute local bank specialization and provide some descriptive statistics of this new variable. We are interested in the *local* industrial specialization of bank branches. Our specialization measure speaks to a measure of revealed comparative advantage in the spirit of Balassa (1965). It aims to measure, at the local level, the comparative advantage of a bank in lending to small firms operating in a given industry and a given vicinity. Our measure addresses the three challenges raised by Paravisini et al. (2017) to build such a measure of specialization. First, we carry out our analysis within-bank so that any effect we capture is not attributable to bank-wide factors that would give a bank a general advantage in all sectors over other banks. Second, our measure is not driven by the industry composition of each local economy because it is a *relative* measure of local concentration. Indeed, we measure the industry specialization of a bank branch by using the share of its lending to an industry in deviation from the average share of lending by other banks to the same industry in the same local geographic area (a urban unit). Thus, the size of an industry in the urban area, which affects bank loan concentration on average across local bank branches, does not influence a branch's specialization. Third, our measure is constructed directly from the observable share of credit going to each industry.

In order to assess the local industry specialization of bank branches, we use

information about all bank branches lending to non-financial firms in continental France between 2010 and 2017 and measure their lending activity towards all domestic non-financial firms (including large firms).[18]

We proceed in four steps. We first define the credit concentration of branch $h$ of bank $b$ in an industrial sector $s$ at date $q$ as the ratio of credit supplied by branch $h$ to firms in $s$ over the total amount of credit supplied by branch $h$ to firms in all sectors:

$$\text{Concentration}_{b,h,s,q} = \frac{\sum_{i \in (b,h,s,q)} L_i}{\sum'_s \sum_{i \in (b,h,s',q)} L_i} \tag{1}$$

where $L_i$ denotes the amount of credit lent by $h$ to a firm $i$.

Second, the credit concentration of $h$ in $s$ needs to be compared with a relevant local benchmark. For this purpose, we aggregate the loan portfolios of all bank branches located in the same urban *area* $u$ as $h$. We then define the benchmark concentration of loans to sector $s$ in the neighborhood of $h$ (at date $q$) as the share of $s$ in the credit supplied by bank branches located in $u$ (including $h$). The relative local credit concentration of branch $h$ in sector $s$ then reads:

$$\hat{S}_{b,h,s,u,q} = \text{Concentration}_{b,h,s,q} - \text{Concentration}_{u,s,q} \tag{2}$$

This measure lies in the ]-1;1[ interval. A relative credit concentration in $s$ equal to zero means that share of $s$ in $h$'s credit portfolio is aligned with the composition of lending in the neighborhood, possibly reflecting either a strong presence or the absence of $s$-type firms in this neighborhood. In contrast, a value close to 1 indicates that branch $h$ almost exclusively funds industry $s$, while other banks in the neighborhood do not. In that sense, $h$ is specialized locally in financing industry $s$.

[18] This information set is therefore larger than the sample of bank branches and firms used in the regressions. In practice, we restrict the population to branches located in urban areas with more than 10 branches -which is almost always the case- and branches with more than 5 customer firms. Increasing this threshold to a minimum of 10 borrowers slightly increases the number of branches for which we can compute a specialization indicator but does not affect our results.

Third, we focus on extreme values of $\hat{S}_{b,h,s,u}$. More precisely, a branch is identified as being specialized in industry $s$ (at date $q$) if $\hat{S}_{b,h,s,u}$ is above the 75-th percentile of the distribution of $\hat{S}_{b,h,s,u}$ across all bank branches operating in the same urban unit in quarter $q$. We therefore define a dummy variable $S_{b,h,s,u}$ which takes the value of one if branch $h$ is specialized in industry $s$ at date $q$:

$$S_{b,h,s,u,q} = \mathbb{I}(\hat{S}_{b,h,s,u,} \geq \text{p75}) \tag{3}$$

where $\text{F}(\hat{S}_{b,h,s,u,q})$ is the distribution of relative lending intensity of all branches located in urban area $u$.

Identifying outliers using percentiles has the advantage that it does not rely on any assumptions about the distribution of bank portfolio shares.[19]

Fourth, when a branch $h$ is closed and all its clients are reallocated to branch $h'$, these firms face an exogenous change in the industrial specialization of their relationship lender. For each firm $i$, this matters only as far as either $h$ or $h'$ are specialized in the industry of $i$. We then define a firm-specific *relative change* in the industry specialization due to a branch reallocation. To smooth out some noisy variations due to the small size of some branches and neighborhoods we compute our measure of $\Delta Specialization_{b,i,u,q}$ as the difference between the lagged level of specialization of the closing branch over 4 quarters (moving average) and the lagged level of specialization of the absorbing branch the quarter before the absorption.

$$\Delta S_{b,i,u,q} = S_{b,h,s(i),u,q-1} - S_{b,h',s(i),u}$$

If both branches share the same level of specialization in the industry to which $i$ belongs, denoted $s(i)$, then $\Delta S_{b,i,u,q}$ equals zero and $i$ is not affected. If the closing branch is specialized in $s(i)$ and the absorbing one is not, then $\Delta S_{b,i,u,q}$ is positive and the firm suffers from a Specialization loss. If the closing branch is not specialized

[19] Our results are robust to setting the cut off point at the 90th percentile or at the 75th percentile + 1.5 IQ, as shown in online appendix.

in $s(i)$ and the absorbing one is, then $\Delta S_{b,i,u}$ is negative and the firm experiences a Specialization gain.

In practice, we define industries at the one-digit level of the NACE rev2 classification (refered to using letters from A to S). We therefore measure bank branch specialization in terms of 15 broadly defined sectors, such as agriculture, forestry and fishing (A), mining (B), manufacturing (C), construction (F), wholesale and retail trade and repair of motor vehicles and motorcycles (G), accommodation and food service activities (I) or administrative and support service activities (N).

Finally, to avoid capturing "false" specialization patterns that would be driven by small banks operating in urban units with few firms and ending up looking specialized in a lot of different dimensions, we restrict the number of industries in which a branch may be specialized to a maximum of three.

## 4.2 Stylized facts

In this section, we provide a first description of the industrial specialization of bank branches in France in the 2010s. First, we find that the local industrial specialization of bank branches is a rather common phenomenon. Some 34% of bank branches lending to firms are specialized in lending to at least one industry at some point in time. Moreover, specialized bank branches are not clustered in some region but roughly equally spread across the whole country, as the second panel of Figure 2 shows. Specialized branches are present in some 90% of urban units where bank branches lending to firms are located, although they are more numerous in larger cities hosting a larger number of branches. On average over 2010-2017, the probability that a firm is borrowing from a bank branch that is specialized in financing its industry is close to 30%.

Second, we observe that most (broadly defined) industries benefit from the presence of locally specialized bank branches. Figure 5 shows the number of specialized bank branches per industry as of September 2017, to be compared to the

some 12,000 bank branches in our sample at this date. Some 900 branches come out as being specialized in lending to the transportation and storage sector [H]. About 750 and 700 branches are specialized in lending to firms which operate in the information and communication sector [J] and, respectively, in the construction sector [F]. In contrast, almost no branches are specialized in funding firms selling other services activities [S] or manufacturing firms [C].

The upper panel of Table 3 provides a view on branch specialization from the perspective of individual banks as of September 2017. The 294 banks in our sample have between one and 1,152 branches in mainland France. On average, a bank has a network of 35 branches, a dozen of which are specialized. However, these distributions are skewed by the large number of small banks, as the median bank only has one branch in this sample. To get a more informative picture of the situation of so-called "network" banks, which run retail banking operations through a network of local branches and make up the bulk of credit supply to firms, the lower panel of the same table shows the same statistics when we focus on the sub-sample of the 81 banks with at least 10 branches. The average network bank has some 120 branches lending to non-financial firms, while 37% of these branches are specialized in supplying credit to at least one industry.

Finally, we ask whether specialized branches within a bank tend to be all specialized in the same industry, which would suggest that the coutrywide specialization pattern of the banks prevails over what we would mistakenly view as local specialization patterns. We first compute within each urban unit the share of specialized bank branches which do *not* share the same industry specialization locally as their parent bank coutrywide (e.g., a branch specialized in funding transportation firms which belongs to a bank specialized in funding manufacturing firms fits in this category). Figure 6 convincingly shows that local branch specialization is largely disconnected from the whole bank's specialization. In the most populated areas, such as the largest urban centers or the French Riviera, the majority of specialized branches are indeed not aligned with the specialization of their parent bank.

Second, we compute for each bank the Hirschman-Herfindahl index of its number of specialized branches in each of the fifteen industries. Conceptually, the index takes the value of one whenever all the bank's specialized branches are specialized in the same industry. Conversely, the index takes a value close to zero (the inverse of the number of local branches) whenever each of its branches is specialized in a different industry. We then look at the distribution of this index across banks. Results are shown on the last line of each panel in Table 3. We find that this HHI index is low on average (0.15), with a value of 0.1 for more than 75%s of larger, "network" banks. This confirms that, within-bank, branch specialization is barely concentrated in a few industries only.

We also provide detailed statistics on the relative importance of specialized branches at the urban unit level, over our sample period. In doing so, we differentiate between small and large urban units (see Table 4). The average urban unit has roughly eight bank branches but heterogeneity is high, with the smallest urban units having three branches, while the top 150 have more than fifty branches. Specialized branches account on average for roughly a third of the branches and there are less specialized branches in smaller urban units (32%) than in larger ones (56%). The vast majority of bank branches are specialized in a single industry only.

Lastly, in Table 5, we provide statistics on specialized branches, comparing specialized branches and non-specialized branches. For specialized branches, the within-branch HHI of lending by industry is below 50%, indicating that these branches are specialized but well-diversified, and that our measure of specialization - which seeks to capture a comparative advantage - indeed differs from a standard concentration indicator. On average specialized branches serve more than seven industries. Very interestingly non-specialized branches have actually more concentrated lending shares: on average they allocate up to half of their credit to their largest industry. They are not specialized because this industry is also the main industry in the local economy, so that many other banks are also funding it. Overall these statistics illustrate how different our measure is from a measure of lending concentration.

# 5 Empirical strategy

## 5.1 Branch closures and credit supply: firm-bank level analysis

We first aim to identify the loan supply pattern of banks to existing corporate clients around the closing date of bank branches serving these customers. For this purpose, we estimate the change in credit experienced by firm $i$ that borrows from a bank $b$ when the firm is being transferred from a closing branch $h$ to an absorbing branch $h'$ within bank $b$. We aggregate granular firm-branch credit exposures at the firm-bank level and estimate the following empirical model :

$$\begin{aligned} \text{Log(Loan)}_{ibt} = \beta_0 \mathbb{I}\{\text{Announcement}\}_{ib,T-6\leq t\leq T} + \beta_1 \mathbb{I}\{\text{Closing}\}_{ib,t\geq T} \\ + \text{Firm x Bank FE} + \text{Firm x Quarter FE} \\ + \text{Banking group x Quarter FE} + \epsilon_{ijt} \end{aligned} \tag{4}$$

where $i$ denotes a firm, $b$ denotes a bank and $t = T$ is the quarter of closing. The dependent variable $Loan_{ibt}$ measures the euro amount of total debt outstanding between firm $i$ and bank $b$'s branch(es) in quarter t. The indicator variable $\mathbb{I}\{\text{Announcement}\}_{b,T-6\leq t\leq T}$ is set to one during the transition period that follows the announcement of the closing, six quarters before the branch is definitively closed. The indicator variable $\mathbb{I}\{\text{closing}\}_{b,t\geq T}$ takes the value of one after date $t = T$ when the branch of $b$ that used to lend to $i$ definitively closes (meaning that firm $i$ had a positive credit exposure with the closed branch at least one quarter during the 12 quarters that precede the official closing).

We estimate (4) over the period from Q1 2010 to Q3 2017. Our main coefficient of interest is $\beta_1$ which captures to what extent banks that experienced a branch closing modify their loan supply when borrowers are reallocated between branches.

As said above, we restrict the sample to firms located in urban units where at least one bank branch closed over the sample period. This restriction is intended to both limit discrepancies between geographical areas that are treated by branch closures and geographical areas that are not and to reduce the imbalance in terms of size between of our treatment and control groups.

In estimating (4), we face to identification issues. The first one is a possible endogeneity of the bank's choice to close a branch to the condition of local borrowers: a closing may take place in a given area because, e.g., of the lackluster profitability of loans to local firms, reflecting a decline in economic activity in this neighborhood. We address this concern by including firm-bank fixed effects that control for time-invariant characteristics linked to the respective firm-bank match.

Second, we also face the standard challenge of disentangling demand and supply of credit. For this purpose, we include firm-time fixed effects in our regression, which absorb all possible shocks to firms' demand and credit quality, in the spirit of Khwaja and Mian (2008) and many others. This implies that we consider only firms that borrow from at least two banks. We therefore identify the effect of bank branch closures "within" the borrowing firm, i.e., we compare credit amounts borrowed by the same firm in a given quarter from two different banks (typically one that closes its local branch and one that does not), before and after the branch closing that affects one of the credit relationships maintained by the firm. Last, note that we also include banking group-quarter fixed effects among the regressors in (4) in order to control for shocks at the more aggregate banking-group level that may also govern local lending decisions.

## 5.2 Branch closures and credit supply: firm-level analysis

In a second step, we check whether a firm is able to compensate for the negative credit shock that may be associated with a branch reallocation within one of its

lenders. For this purpose, we collapse our database at the firm level and estimate the following model:

$$\begin{aligned} \text{Log(Loan)}_{it} = \beta_0 \mathbb{I}\{\text{Announcement}\}_{i,T-6\leq t\leq T} + \beta_1 \mathbb{I}\{\text{closing}\}_{i,t\geq T} \\ + \text{Firm FE} + \text{Industry x quarter FE} \\ + \text{Banking group x Urban unit x quarter FE} + \epsilon_{it} \end{aligned} \tag{5}$$

where $i$ stands for the firm. Now, the dummy variable $\mathbb{I}\{Closing\}_{t\geq k}$ takes the value of one whenever the firm faces the closing of one of its relationship bank branches. Again, we control for unobserved characteristics of the firms, as well as for demand shocks and time varying local factors at the industry level and geographical location level, as well as for other unspecified bank-level shocks, by saturating the model with appropriate sets of fixed effects.

## 5.3 Branch closures and change in the industry specialization of the bank

Last, we investigate whether and to what extent local bank specialization contributes to explaining the effect of a branch reallocation on the supply of credit to the bank's customers. We test for the role of the local specialization of bank branches by estimating an augmented version of the previous empirical model (4):

$$
\begin{aligned}
\text{Log(Loan)}_{ibt} = {} & \beta_0 \mathbb{I}\{\text{Announcement}\}_{ib,T-6\leq t\leq T} + \beta_1 \mathbb{I}\{\text{Closing}\}_{ib,t\geq T} \\
& + \beta_2 \Delta S_{b,i,u} \mathbb{I}\{\text{Announcement}\}_{ib,T-6\leq t\leq T} \\
& + \beta_3 \Delta S_{b,i,u} \mathbb{I}\{\text{Closing}\}_{ib,t\geq T} \\
& + \beta_4 S_{b,i,u} \\
& + \text{Firm x Bank FE} + \text{Firm x Quarter FE} \\
& + \text{Banking group x Quarter FE} + \epsilon_{ijt}
\end{aligned} \tag{6}
$$

where $\Delta S_{b,i,u}$ measures the *relative loss* in *firm-specific* branch specialization when the firm $i$ is reallocated from the closed branch $h$ to another branch $h'$ of the same bank $b$. For instance, $\Delta S_{b,i,u}$ takes the value of $+1$ whenever the closed branch was specialized in lending to the firm's industry $s(i)$, whereas the new branch is not. We then control for the initial level of borrower-specific industrial specialization of the closed branch and saturate the model with fixed effects in order to control for firm-bank matching and for changes in credit demand.

# 6 Results

## 6.1 Branch reallocation and credit supply at the firm-bank level

Table 6 shows our results when we estimate the effect of a branch closing on credit at the firm-bank level, as specified in equation (4). We find that, within their bank, firms that are reallocated to a new branch after a branch closing face a sizeable reduction in credit supply. A proper identification of this negative supply shock may be hampered if the decision to close the branch is correlated with other factors potentially also affecting the new branch, such as local economic conditions, the average credit quality of borrowers, regulatory constraints etc. To address such

concerns, in columns 1 to 4 of Table 6, we progressively saturate our model with an extensive set of fixed effects.

First, in column (1), thanks to the inclusion of bank-firm fixed effect among regressors, we account for potential differences in borrower-lender pairs, e.g. weak banks matching with weak borrowers. This implies that our effect is estimated within an existing bank-firm relationship (intensive margin), and does not capture the creation or destruction of bank-firm relationships (extensive margin). Next, in column (2), we control for firm-level demand (or credit quality) shocks (to the extent that demand is equally spread over banks) by including firm-quarter fixed effects. We then add banking group-quarter fixed effects to account for fluctuations in credit supply that would be driven by shocks at the group level (such as regulatory shocks on the level of required capital). Last, we control for variations of banking groups' credit supply at the local level (such as a stategic decision to divest from some areas) by including banking group-urban unit-quarter dummies.

Whatever the set of fixed effects used as controls, we find robust evidence of a significant drop in the amount of credit supplied to a reallocated firm. The credit contraction is already significant during the transition period after the branch closing annoucement but before the effective closing and transfer of the firm's account. The magnitude of the contraction in credit supplied is however twice as large after the reallocation. This contraction is economically significant: the amount of total credit made available to the firm (including undrawn credit lines) drops by some 12% due to the branch reallocation. For the average firm-bank relationship in our sample, this amounts to a cut by some $60,000$ euros.

In the last two columns of the table, we provide complementary results on the impact of a branch reallocation on the credit mix supplied to the firm and the distance between borrower and lender. Column (5) shows that the ratio of long-term credit over total credit (drawn and undrawn) is not significantly affected by the reallocation. This suggests that firms facing a branch closing do not draw

more on credit lines thereafter. Column (6) confirms the intuition that a branch reallocation increases the average distance between a borrower and its bank. The estimated coefficient corresponds to a doubling firm-bank distance for reallocated firms.

Last, we take a closer look at how the identified effect unfolds over time. Figure 7 shows the estimation results of a dynamic version of equation 4, where we interact the closing indicator with dummies for each quarter instead of a unique ex-post period.[20] Credit supply starts to drop around closing announcement. After the closing, the contraction in lending is quite persistent and holds out over at least three years. The result is consistent with Nguyen (2019) who shows that, following a merger, branch closures lead to a decline in local small business lending that persists during up to six years. Importantly for identification, the figure also shows that the usual parallel trend assumption is vindicated before the closing annoucement.

## 6.2 Can multi-bank firms compensate for the effect of a branch reallocation?

Table 7 shows estimation results for equation (5), when the bank-firm data is collapsed at the firm level. Note that we use here the same sample of firms as in the analysis above. We find that the average small firm borrowing from at least two banks is only partly able to compensate for the decline in credit that follows a branch reallocation within one of its banks. More precisely, the branch reallocation seems to have no effect on the total supply of credit to the firm during the transition period, while the ratio of long-term drawn lending to total credit slightly decreases. This suggests that the firm may be able to negotiate in the short run an increase of its credit lines with the other lenders. However, once the branch closing is effective, the average small firm still faces a contraction by some 4% of the total of its bank

[20] In the figure, we take as a reference period the quarter two years-ahead of the effective closing (i.e., the corresponding interacted dummy is excluded from the regressors). Results are unchanged if we take the whole pre-announcement period as a reference.

borrowings.

Last, figure 8 shows the estimated coefficients of interest in a dynamic version of (5). The total amount of credit borrowed by a treated firm reaches a trough after two years. The contraction in the firm's access to credit is still significant three years after a branch reallocation.

### 6.3 The benefits of the local industry specialization of banks

We now turn to estimating equations (6), so as to highlight how the local industry specialization of banks shapes bank lending to small firms. We hypothesize that, as in Paravisini et al. (2017), specialization give lenders a market-specific advantage relative to other lenders, which makes credit from one bank difficult to substitute with credit from another. As a result firms chosing to match with a specialized bank may not be able to get similar funding conditions when being randomly reallocated to a new branch, which is not specialized. As regards firms that were not matched to a specialized branch and end up being matched to one following a closure, what we should expect is less clear. As matching between firms and banks is endogenous, low type firms may have strategically chosen not to bank with a specialized branch; for such firms a reallocation to a new and specialized branch may reveal firm's type and reduce credit access. For high type firms, credit access should on the contrary improve.

First, table 8 presents the results of regression (6) using firm-bank data. It shows robust evidence that the drop in credit supply associated with a branch reallocation is strongly amplified when the firm looses the benefit of being connected to a bank branch that was specialized in its industry. The impact of specialization almost doubles our baseline estimate of the effect of a branch closure, as shown by the coefficient estimates of the interacted $Closing \times \Delta Spec$ in columns 2 and 4. In addition we control for the average specialization of the main bank in columns 3 to 5 and we show that small firms that are matched to a specialized branch receive

on average 4% more credit on a regular basis as shown by the coefficient of branch specialization.

Next we investigate whether the effects of a change in specialization are symmetric. To this end we split our $\Delta$ spec variable between specialization gains and losses. When a branch reallocation entails a bank specialization loss, the contraction in credit supply is roughly twice as large as otherwise (with a coefficient for the interacted term pointing to a cut in outsanding amounts by 12%). As shown in column (5), the effect is not symmetric however: borrowers that end up being matched to a branch with the relevant specialization do not significantly benefit from the branch reallocation in spite of the gain in terms of higher skills of the lender. [21]

The impact of branch closures on credit supply to SMEs may also go through other channels which may be correlated with changes in industry specialization. We therefore check for the robustness of our findings to the inclusion of additional interaction terms in regression (6). Table 8 shows our results. First, we find that the effect of the loss in bank specialization is not wiped out by the concommitant increase in bank-firm distance due to the branch reallocation. Specifically, we interact in column (2) our closing dummy *closing* $\times$ *post* with an indicator variable $\Delta$*distance* which equals 1 (resp. -1) if the closing entails an increase (resp. a decrease) in the firm-bank distance by more than 20 kilometers, i.e. twice the median of the firm-branch distance in our whole sample. We observe that the increased distance does not seem to matter much (the coefficient is negative as expected but non significant). Accordingly, the specialization coefficient does not bulge.

Second, we test whether the coefficient for the loss in bank specialization captures the possible confounding effect of a decrease in local lending concentration associated with the branch reallocation. In column (3), we interact the closing event with a dummy variable equals to one if local bank competition (measured in

[21] In unreported firm-level regressions we find again that a firm which looses access to a specialized branch experiences a significant credit contraction, the magnitude of which is lower than at the firm-bank level. Firm is thus unable to fully compensate for the lower provision of credit by borrowing more from its other lenders.

the urban unit of the absorbing branch) is lower than the median competition. The coefficient is negative and significant, which suggests that entering an environment of weak bank competition worsens the outcome of the branch reallocation. However, controlling for changes in competition in the local credit market due to the transfer does not wipe out the effect of the specialization loss *per se*.

Third, if specialization is correlated with relationship lending then we may just be capturing a loss of soft information when this relationship ends. To rule out this story we use relationship length as a proxy for relationship lending and interact our closing dummy with a dummy which takes the value 1 if the closure triggers the end of a lending relationship of more than 3 years.

Last, we further investigate the role of local bank competition in shaping the response of SME lending to branch closures. For this purpose, we divide our sample of closing events into two groups: closures with an absorbing branch that is located in a *low-competition* urban unit, in column (5) versus located in a *high-competition* urban unit, in column (6).

In an environment of low competition, the loss in industry-specific knowledge following a closing matters. A rationale for this could be that less effort is required from the bank in the new environment to keep customers and reaping the rents associated with prior information extraction. As a result the loan officer has no incentive to exert an extra monitoring effort to compensate the loss of industry-specific knowledge required to accomodate the credit needs of these customers.

On the contrary, a branch closure in a highly competitive environement does not affect the transfered firms, whatever the degree of specialization of the closed branch: the coefficient for the closing *per se* is still negative but not significant anymore. The same happens to the coefficient capturing the additional effect of bank specialization loss. This suggests that the loss of sectoral expertise by loan officers is offset by additional effort on their part to maintain firms' access to credit and avoid a decline in their market advantage. Thus, a high competitive pressure is enough to ensure continuity in the level of credit supplied by the reallocating bank

to small firms.

# 7 Conclusion

In this paper, we provide evidence that a large share of local bank branches in France are specialized in lending to some industries. We also show that this local bank specialization matters for SMEs' access to credit: a small firm enjoys on average a better access to bank credit when the local branch of its relationship bank has gained a better knowledge of the industry to which the firm belongs. Using a very rich dataset on bank branch closures over 2010-2017, we find that closures on average entail a substantial and persistent loss in credit supplied for the local customers which are transfered to another branch. Importantly howvever, firms which, as a consequence, lose access to loan officers specialized in their industry are more badly hit than others. This effect is not wiped out when considering confounding factors such as the increased distance or chnages in bank competition that may be associated with the transfer.

Our findings have possibly important policy implications. First, competition regulators overseeing cuts in bank branch networks following bank mergers should be aware that local bank specialization exists and matters for credit supply to SMEs. Concerns may arise if simple competition rules, such as the obligation to close one of two branches in a given area, are implemented bluntly. Second, supervisors and bank managers should be aware that closing specialized branches may have differentiated effects on small borrowers, depending on their industry.

Many issues remain however open, and left for futher research. A first, looming question is of course to understand how and why local bank branches become specialized in funding one specific industry (more than other neighbour branches do). A possible cause of specialization may be diffusion effects within bank networks of

customers (e.g., buyers and suppliers, or members of local professional clubs): in other words, the lending pattern of a branch is likely to be history-dependent. An idiosyncratic role of some loan officers, who e.g. join a branch with a better experience in dealing with a certain type of firms, also comes to mind. In this case, the pending issue for bank managers is to ensure that such human capital is not lost whenever the branch closes. Drexler and Schoar (2014) suggest that soft information can be transfered between bank employees when loan officer turnover is properly anticipated. The same could be expected regarding transfers of industry-specific knowledge.

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# Figures

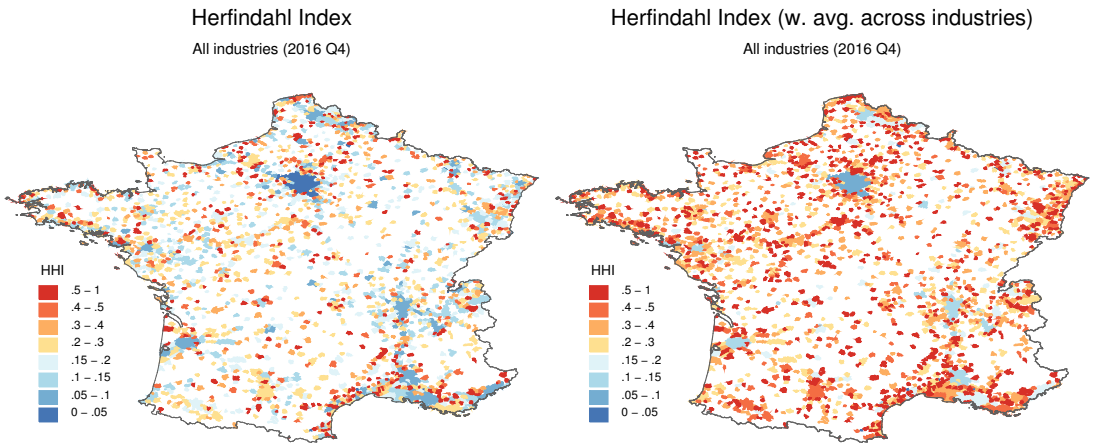


Figure 1: Herfindahl Index at urban unit level

**Note:** The figure plots, for each urban unit, two different measures of credit market concentration. The first Herfindahl Index (left panel) is the standard concentration measure, calculated using total lending shares within each unit. The second (right panel) is the (credit) weighted average of industry-specific credit market concentrations within each unit, which therefore accounts for market segmentation. Data as of December 2016.

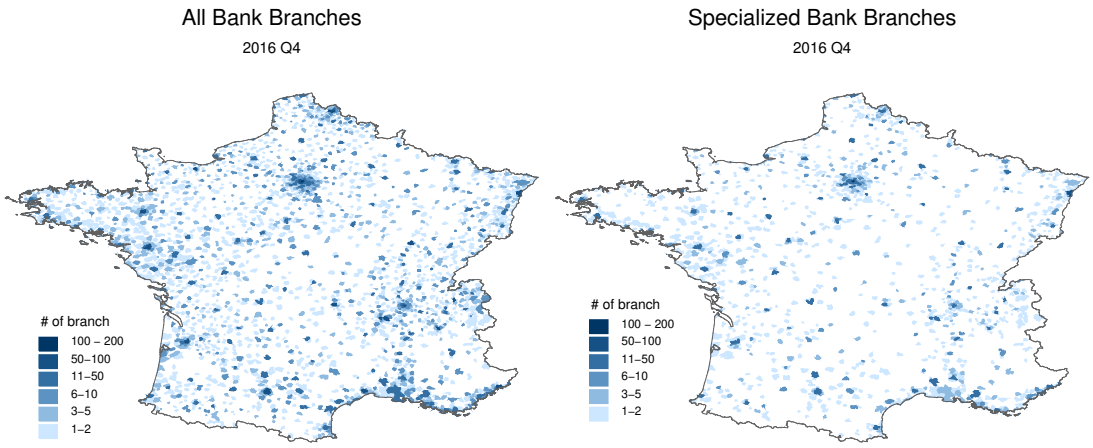


Figure 2: Geographical distribution of bank branches lending to SMEs in France (2016).

**Note:** This map locates all bank branches lending to SMEs in mainland France as of December 2016 (left panel) vs "specialized" branches only (right panel). See section 4 for the definition of the industry specialization of bank branches. Location refers to the ZIP code of the branch. ZIP codes in white are cities without any bank branch lending to SMEs in December 2016. The darkest color stands for ZIP codes where more than 100 bank branches are located.

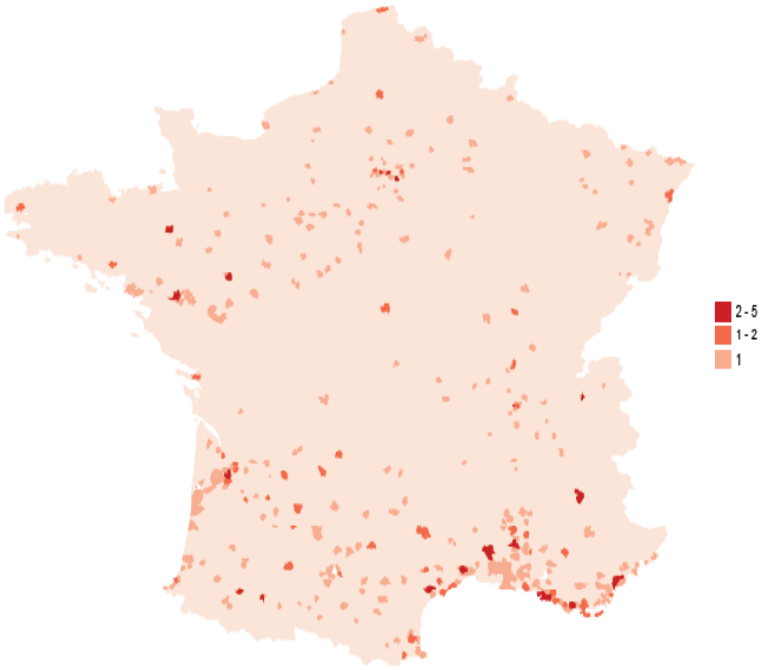


Figure 3: The geography of bank branch closures in France, 2010-2017.

**Note:** This map locates bank branch closures in mainland France over the period from 2010 Q1 to 2017 Q3. Location refers to the ZIP code of the closed down branch. The sample is limited to branches actively lending to SMEs according to the credit register and, before 2015, to branches of banks that had already opted for the "RIB permanent"system of account management.

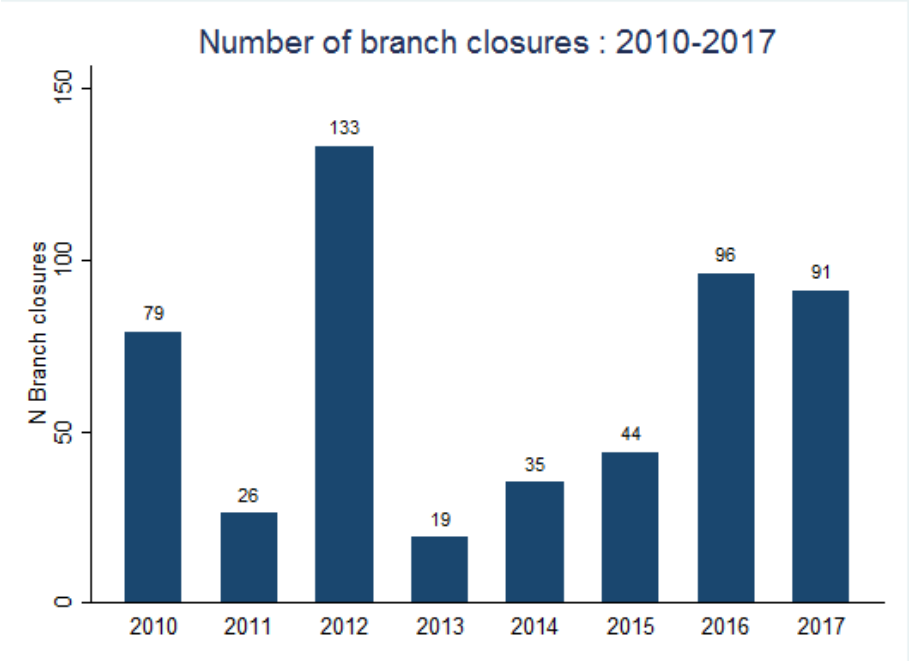


Figure 4: Time series of branch closures in France, 2010-2017.

**Note:** This graph shows the annual number of branch closures over the period from 2010 Q1 to 2017 Q3 in our cleaned dataset. The sample is limited to branches actively lending to SMEs according to the credit register, and, before 2015, to branches of banks that had already opted for the "RIB permanent"system of account management.

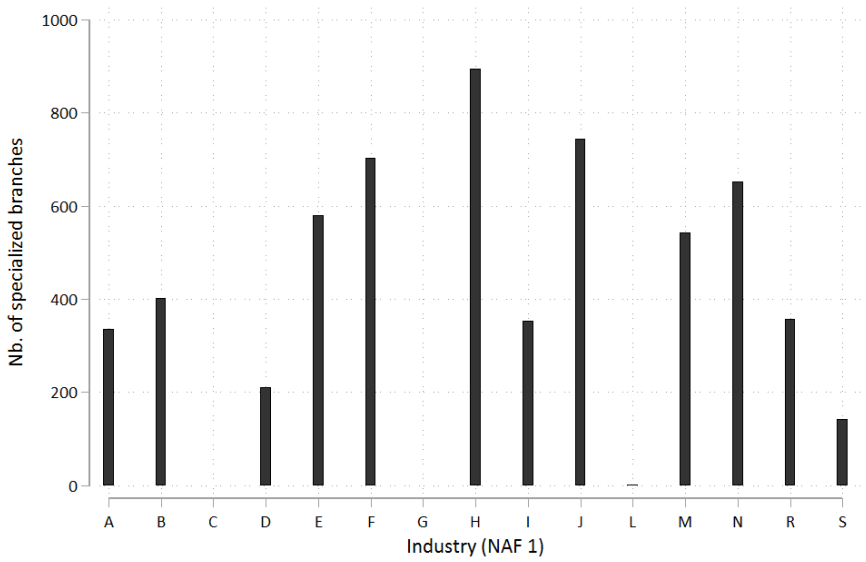


Figure 5: Number of specialized bank branches by borrowing industry.

**Note:** This graph shows the number of bank branches specialized in each of the 15 NACE rev2 one-digit industries (among branches lending to SMEs in our sample). A: Farming, forestry and fishing, B: Mining and quarrying, C: Manufacturing, D: Electricity, gas, steam and air conditioning supply, E: Water supply, sewerage and waste management, F: Construction, G: Wholesale and retail trade and repair of motor vehicles, H: Transportation and storage, I: Accomodation and food services activities, J: Information and communication, L: Real estate activities, M: Professional, scientific and technical activities, N: Administrative and support service activities, R: Arts, entertainment and recreation, S: Other service activities.

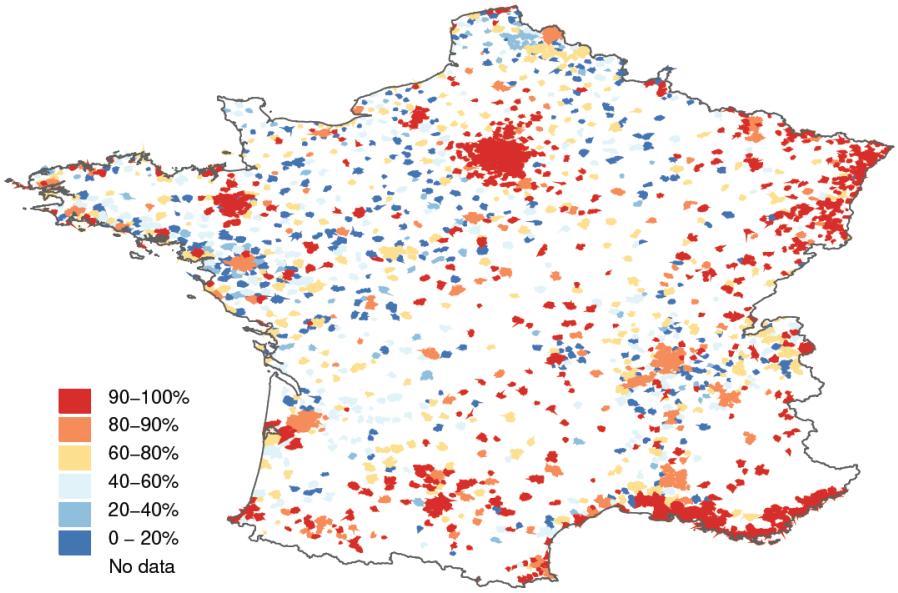


Figure 6: Share of specialized branches not aligned with the industry specialization of their parent bank, by urban unit (2016).

**Note:** The figure plots, for each urban unit, the share of specialized bank branches with an industry specialization which differs from the industry specialization of their parent bank. Data as of December 2016.

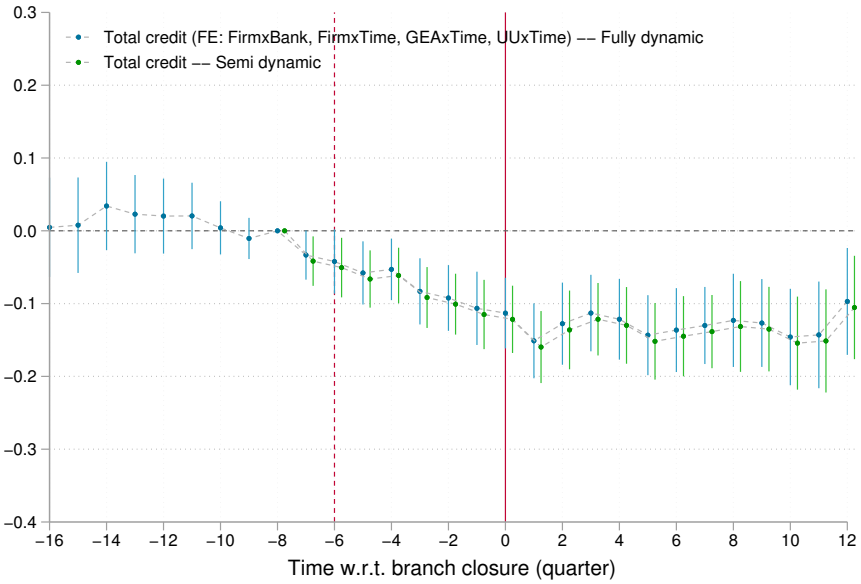


Figure 7: Impact of a branch closure on credit: firm-bank level analysis.

This graph shows estimation results for a dynamic version of equation 4. The dependent variable is the natural logarithm of total credit outstanding (in euro thousands) at the bank-firm level in quarter $t$, including unused credit lines. Time 0 is the date of the closure of the bank's branch which lends to $i$. Coefficients for each quarter, prior to, and following the bank branch closure, are plotted along with 95% confidence intervals. Quarter $t-8$ is used as a reference and the corresponding dummy is omitted from the regression. The time period between the dashed line and the solid line is the 6-quarter transition 's branch period between the announcement date of the branch closure and the official closing date. The sample period is Q1 2010 to Q3 2017.

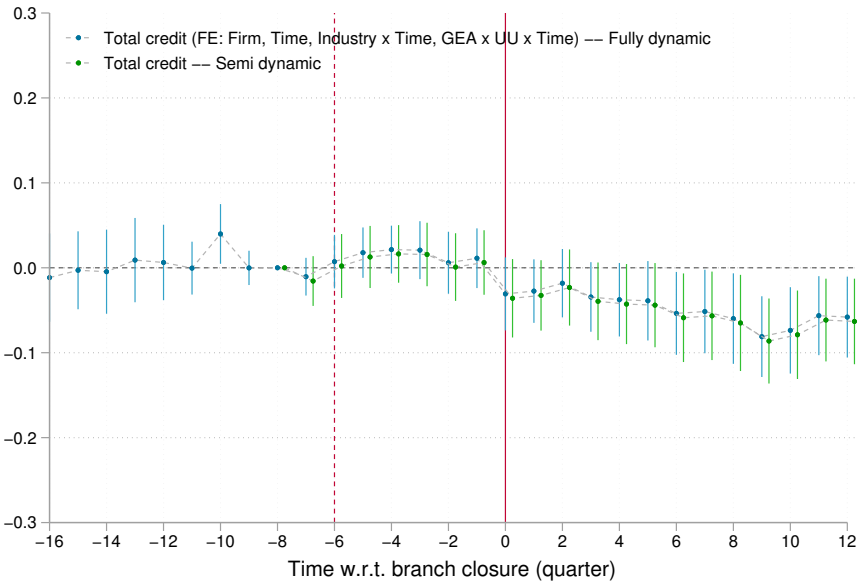


Figure 8: Impact of a branch closure on credit: firm-level analysis.

This graph shows estimation results for a dynamic version of equation 5. The dependent variable is the natural logarithm of total bank credit outstanding (in euro thousands) at the firm level in quarter $t$, including unused credit lines. Time 0 is the date of the closure of a bank branch which lends to $i$. Coefficients for each quarter, prior to, and following the bank branch closure, are plotted along with 95% confidence intervals. Quarter $t-8$ is used as a reference and the corresponding dummy is omitted from the regression. The time period between the dashed line and the solid line is the 6-quarter transition 's branch period between the announcement date of the branch closure and the official closing date. The sample period is Q1 2010 to Q3 2017.

# Tables

Table 1: Firm-bank-level summary statistics.

| | p10 | p25 | Median | p75 | p90 | Mean | Nb.Obs. |
|---|---|---|---|---|---|---|---|
| Firm-Bank x quarter level of obs. | | | | | | | |
| Nb. firms per quarter | 72603.0 | 75997.0 | 78742.0 | 80111.0 | 80306.0 | 77520.4 | 5,211,791 |
| Nb. banks per quarter | 311.0 | 322.0 | 346.0 | 377.0 | 379.0 | 346.1 | 5,211,791 |
| Nb. branches per quarter | 10665.0 | 11246.0 | 12054.0 | 12317.0 | 12599.0 | 11780.3 | 5,211,791 |
| Nb. firm-bank rel. per quarter | 174200.0 | 185194.0 | 190519.0 | 192558.0 | 195465.0 | 187246.7 | 5,211,791 |
| Total Loan | 34.0 | 63.0 | 150.0 | 380.0 | 939.0 | 527.6 | 5,211,791 |
| - Drawn credit | 8.0 | 43.0 | 115.0 | 308.0 | 779.0 | 427.7 | 5,211,791 |
| - Long-term loans | 0.0 | 0.0 | 39.0 | 164.0 | 491.0 | 294.5 | 5,211,791 |
| - Short-term loans | 0.0 | 0.0 | 1.0 | 86.0 | 294.0 | 133.2 | 5,211,791 |
| - Undrawn credit line | 0.0 | 0.0 | 0.0 | 29.0 | 151.0 | 99.8 | 5,211,791 |
| MLT ratio | 0.0 | 0.0 | 0.5 | 1.0 | 1.0 | 0.5 | 5,211,791 |
| Average distance in km | | | | | | | |
| Total Loan | 0.0 | 4.3 | 13.6 | 56.2 | 272.0 | 75.3 | 5,211,791 |
| - Distance, Drawn credit | 0.0 | 4.2 | 12.8 | 51.4 | 209.9 | 69.0 | 4,811,504 |
| - Distance, Long-term loans | 0.0 | 3.6 | 10.9 | 41.2 | 115.4 | 51.3 | 3,354,248 |
| - Distance, Short-term loans | 0.0 | 4.7 | 14.4 | 58.6 | 289.0 | 77.9 | 2,648,396 |
| - Distance, Undrawn credit line | 0.0 | 5.1 | 17.1 | 72.9 | 351.4 | 88.2 | 1,701,646 |

**Note:** The sample period is Q1 2010 to Q3 2017. The average distance between a firm and its lenders, for each type of credit, is computed conditionally on credit being non null. All credit variables are in euro thousands. MLT ratio is the ratio of long-term credit over the total of drawn credit and unused credit lines.

Table 2: Firm-level summary statistics

| | p10 | p25 | Median | p75 | p90 | Mean | Nb.Obs. |
|---|---|---|---|---|---|---|---|
| Firm x quarter level of obs. | | | | | | | |
| Total loan | 63.0 | 141.0 | 339.0 | 865.0 | 2221.0 | 1243.8 | 1,408,070 |
| - Drawn credit | 32.0 | 95.0 | 261.0 | 700.0 | 1824.0 | 1008.1 | 1,408,070 |
| - Long-term loans | 0.0 | 21.0 | 114.0 | 378.0 | 1089.0 | 685.7 | 1,408,070 |
| - Short-term loans | 0.0 | 0.0 | 27.0 | 213.0 | 714.0 | 322.4 | 1,408,070 |
| - Undrawn credit line | 0.0 | 0.0 | 10.0 | 114.0 | 393.0 | 235.7 | 1,408,070 |
| MLT ratio | 0.0 | 0.1 | 0.5 | 0.9 | 1.0 | 0.5 | 1,408,070 |
| Average distance in km | | | | | | | |
| Total loan | 0.8 | 6.2 | 21.7 | 72.6 | 196.5 | 65.7 | 1,408,070 |
| - Distance, Drawn Credit | 0.0 | 6.0 | 20.3 | 66.9 | 187.3 | 63.3 | 1,408,070 |
| - Distance, Long-term loans | 0.0 | 4.8 | 14.6 | 45.1 | 113.9 | 47.1 | 1,408,070 |
| - Distance, Short-term loans | 0.0 | 6.1 | 21.2 | 84.8 | 230.7 | 76.9 | 1,408,070 |
| - Distance, Undrawn credit line | 0.0 | 6.1 | 23.4 | 98.4 | 302.6 | 89.6 | 1,408,070 |

**Note:** The sample period is Q1 2010 to Q3 2017. The average distance between a firm and its lenders, for each type of credit, is computed conditionally on credit being non null. All credit variables are in euro thousands. MLT ratio is the ratio of long-term credit over the total of drawn credit and unused credit lines.

Table 3: Summary statistics on the specialization of bank branches at the bank level (I).

| | **All banks** | | | | | | |
|---|---|---|---|---|---|---|---|
| | Mean | Min | p25 | Median | p75 | Max | Nb.Obs. |
| Number of branches | 33.95 | 1.0 | 1.0 | 1.0 | 20.0 | 1152.0 | 294 |
| Number of specialized branches | 11.65 | 0.0 | 1.0 | 1.0 | 8.0 | 390.0 | 294 |
| Share of specialized branches | 0.58 | 0.0 | 0.2 | 0.6 | 1.0 | 1.0 | 294 |
| Industrial concentration of specialized branches | 0.29 | 0.0 | 0.1 | 0.2 | 0.3 | 1.0 | 294 |
| | **Larger banks** | | | | | | |
| | Mean | Min | p25 | Median | p75 | Max | Nb.Obs. |
| Number of branches | 119.40 | 11.0 | 39.0 | 68.0 | 107.0 | 1152.0 | 81 |
| Number of specialized branches | 39.83 | 4.0 | 10.0 | 21.0 | 41.0 | 390.0 | 81 |
| Share of specialized branches | 0.37 | 0.1 | 0.2 | 0.3 | 0.5 | 1.0 | 81 |
| Industrial concentration of specialized branches | 0.15 | 0.1 | 0.1 | 0.1 | 0.2 | 0.5 | 81 |

**Note:** For each quarter from Q1 2010 to Q3 2017, we compute the share of specialized branches as the ratio of the number of bank branches that are specialized in at least one industry over the total number of bank branches active in our final sample. The industrial concentration of specialized branches is an HHI index that is equal to one if, within a bank, all specialized branches are specialized in the same industry and close to zero if each specialized branch is specialized in a different industry. Larger banks are banks which operate more than 10 branches lending to SMEs.

Table 4: Summary statistics on specialized bank branches at the urban unit level (II).

| | All Urban Units | | | | |
|---|---|---|---|---|---|
| | Mean | p25 | Median | p75 | Nb.Obs. |
| Number of branches in UU | 7.51 | 1.00 | 2.00 | 4.49 | 1522 |
| Sh. specialized | 0.34 | 0.03 | 0.33 | 0.55 | 1522 |
| in 1 industry | 0.30 | 0.03 | 0.28 | 0.45 | 1522 |
| in 2 industries | 0.04 | 0.00 | 0.00 | 0.04 | 1522 |
| in 3 industries | 0.00 | 0.00 | 0.00 | 0.00 | 1522 |
| | **Large Urban Units** | | | | |
| | Mean | p25 | Median | p75 | Nb.Obs. |
| Number of branches in UU | 50.46 | 13.37 | 19.42 | 38.78 | 156 |
| Sh. specialized | 0.56 | 0.50 | 0.57 | 0.63 | 156 |
| in 1 industry | 0.41 | 0.36 | 0.42 | 0.46 | 156 |
| in 2 industries | 0.14 | 0.10 | 0.14 | 0.18 | 156 |
| in 3 industries | 0.01 | 0.00 | 0.00 | 0.01 | 156 |
| | **Small Urban Units** | | | | |
| | Mean | p25 | Median | p75 | Nb.Obs. |
| Number of branches in UU | 2.61 | 1.00 | 1.82 | 3.38 | 1366 |
| Sh. specialized | 0.32 | 0.00 | 0.28 | 0.50 | 1366 |
| in 1 industry | 0.29 | 0.00 | 0.25 | 0.44 | 1366 |
| in 2 industries | 0.03 | 0.00 | 0.00 | 0.01 | 1366 |
| in 3 industries | 0.00 | 0.00 | 0.00 | 0.00 | 1366 |

**Note:** For each quarter from Q1 2010 to Q3 2017, we compute the share of specialized branches as the ratio of the number of bank branches that are specialized in at least one industry, exactely one industry or two industries, over the total number of bank branches active in our final sample.

Table 5: Summary statistics on specialized bank branches (III).

| | **All Urban Units** | | **Large Urban Units** | | **Small Urban Units** | |
|---|---|---|---|---|---|---|
| | Specialized branches | Not specialized | Specialized branches | Not specialized | Specialized branches | Not specialized |
| Branch HHI (by industry) | 0.43 | 0.46 | 0.43 | 0.51 | 0.39 | 0.39 |
| Number of industries served | 8.59 | 8.67 | 8.63 | 8.37 | 8.41 | 9.12 |
| Sh. credit to largest industry | 0.57 | 0.61 | 0.58 | 0.66 | 0.54 | 0.54 |
| Number of clients | 148.55 | 101.37 | 164.58 | 109.07 | 81.02 | 89.65 |
| Total credit (Keuros) | 99409.03 | 41479.60 | 118819.09 | 58072.16 | 17608.88 | 16241.63 |

**Note:** We compute (i) the average industrial concentration of bank branches' portfolio, (ii) the average number of industries served and (iii) the average share of total credit lent to the largest, second and third industries, for bank branches active in our final sample over the period Q1 2010 to Q3 2017. The industrial concentration of bank branches is an HHI index that is equal to one if the bank only lends to firms in the same industry, and close to zero if the branch lends to firms in many different industries. Large urban units are urban units with at least 10 bank branches, small urban units are urban units with less than 10 bank branches.

Table 6: Branch closures and SMEs' access to credit: firm-bank level analysis.

| | Total credit | | | | MLT ratio | Distance |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Closing x Post | -0.252*** | -0.112*** | -0.124*** | -0.116*** | 0.009 | 0.678*** |
| | (0.012) | (0.018) | (0.019) | (0.021) | (0.006) | (0.043) |
| Announcement x Post | -0.143*** | -0.059*** | -0.072*** | -0.064*** | 0.002 | 0.193*** |
| | (0.010) | (0.015) | (0.016) | (0.017) | (0.005) | (0.037) |
| Firm x Bank FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm x Quarter FE | | Yes | Yes | Yes | Yes | Yes |
| Banking Group x Quarter FE | | | Yes | | Yes | Yes |
| Banking Group x UU x Quarter FE | | | | Yes | | |
| Observations | 5,177,193 | 3,932,607 | 3,931,733 | 3,821,431 | 3,931,733 | 3,821,431 |
| R-Square | 0.80 | 0.90 | 0.90 | 0.91 | 0.89 | 0.98 |

**Note:** This table shows estimation level for regression (4). The sample period is Q1 2010 to Q3 2017. The dependent variable in columns 1 to 4 is the log amount of total credit outstanding (in euro thousands) at the firm-bank $i, b$ level, in quarter $t$ (including unused credit lines). The dependent variable in column 5 is the ratio of medium to long-term loans over total loans for firm-bank relationship $i - j$ in quarter $t$. The dependent variable in column 6 is the natural logarithm of the distance in kilometers between a firm and its banks. *Closing* $\times$ *Post* is the 16-quarter period starting after the official date of branch closure. *Announcement* $\times$ *Post* is the 6-quarter period starting with the announcement of the branch closure and ending with the official branch closure. *Urban Unit* denotes the urban unit of the location of the firm. Robust standard errors (clustered at the urban unit x year level) are in parentheses.

Table 7: Branch closures and SMES' access to credit: firm-level analysis

| | Total credit | | | | | MLT ratio | Distance |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Closing × Post | -0.050*** | -0.041** | -0.041** | -0.039** | -0.041** | -0.005 | 0.115*** |
| | (0.018) | (0.019) | (0.019) | (0.019) | (0.020) | (0.005) | (0.026) |
| Announcement × Post | -0.003 | 0.011 | 0.014 | 0.016 | 0.016 | -0.007* | 0.057 |
| | (0.012) | (0.013) | (0.013) | (0.013) | (0.014) | (0.004) | (0.022) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Quarter FE | Yes | | | | | | |
| Urban Unit x Quarter FE | | Yes | Yes | Yes | | Yes | Yes |
| Industry x Quarter FE | | | Yes | Yes | Yes | Yes | Yes |
| Banking Group x Quarter FE | | | | Yes | | Yes | Yes |
| Banking Group x UU x Quarter FE | | | | | Yes | | |
| N of clusters | 726 | 726 | 726 | 726 | 726 | 726 | 726 |
| Observations | 1,408,070 | 1,408,070 | 1,408,070 | 1,408,070 | 1,408,070 | 1,408,070 | 1,408,070 |
| R-Square | 0.84 | 0.84 | 0.85 | 0.85 | 0.86 | 0.78 | 0.84 |

**Note:** This table shows estimation level for regression (6). The sample period is Q1 2010 to Q3 2017. The dependent variable in columns 1 to 4 is the log amount of total credit outstanding (in euro thousands) at the firm $i$ level, in quarter $t$ (including unused credit lines). The dependent variable in column 5 is the ratio of medium to long-term loans over total loans for firm $i$ in quarter $t$. The dependent variable in column 6 is the natural logarithm of the distance in kilometers between a firm and its banks. *Closing* × *Post* is the 16-quarter period starting after the official date of branch closure. *Announcement* × *Post* is the 6-quarter period starting with the announcement of the branch closure and ending with the official branch closure. *Urban Unit* denotes the urban unit of the location of the firm. Robust standard errors (clustered at the urban unit x year level) are in parentheses.

Table 8: Branch closures, branch specialization and SMEs' access to credit: firm-bank level analysis.

| | Total credit | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Announcement x Post | -0.072*** | -0.072*** | -0.070*** | -0.071*** | -0.071*** |
| | (0.016) | (0.016) | (0.016) | (0.016) | (0.016) |
| Announcement x Post x Δ specialization | | -0.079** | | -0.078** | |
| | | (0.039) | | (0.039) | |
| Closing x Post | -0.124*** | -0.125*** | -0.123*** | -0.123*** | -0.112*** |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.023) |
| Closing x Post x Δ specialization | | -0.131*** | | -0.121*** | |
| | | (0.042) | | (0.043) | |
| Closing x Post x Specialization loss | | | | | -0.120** |
| | | | | | (0.060) |
| Closing x Post x Specialization gain | | | | | 0.042 |
| | | | | | (0.056) |
| Branch specialization (MA over 4Q) | | | 0.043*** | 0.043*** | 0.043*** |
| | | | (0.004) | (0.004) | (0.004) |
| Firm x Bank FE | Yes | Yes | Yes | Yes | Yes |
| Firm x Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Banking Group x Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 |
| R-Square | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |

**Note:** This table shows estimation level for regression (6). The sample period is Q1 2010 to Q3 2017. The dependent variable is the log amount of total credit outstanding (in euro thousands) at the firm-bank $i, b$ level, in quarter $t$ (including unused credit lines). *Closing* × *Post* is the 16-quarter period starting after the official date of branch closure. *Announcement* × *Post* is the 6-quarter period starting with the announcement of the branch closure and ending with the official branch closure. Δ *specialization* is the difference between the lagged level of specialization of the closing branch over 4 quarters (moving average) and the lagged level of specialization of the absorbing branch the quarter before the absorption. *Closing* × *Post* × *Specialization loss* indicates that the closing branch was specialized while the absorbing branch is not (Δ specialization >0 ). On the contrary, *Closing* × *Post* × *Specialization gain* indicates that the closing branch was not specialized while the absorbing branch is (Δ specialization <0 ). *Urban Unit* denotes the urban unit of the location of the firm. Robust standard errors (clustered at the urban unit x year level) are in parentheses.

Table 9: Branch closures, branch specialization and SMEs' access to credit: the role of distance and competition.

| | Total credit | | | | | |
|---|---|---|---|---|---|---|
| | | | | | Low comp. | High comp. |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Announcement x Post | -0.071*** | -0.071*** | -0.070*** | -0.063*** | -0.066*** | -0.061 |
| | (0.016) | (0.016) | (0.016) | (0.016) | (0.017) | (0.047) |
| Closing x Post | -0.112*** | -0.101*** | -0.071*** | 0.057 | -0.080** | -0.114 |
| | (0.023) | (0.035) | (0.027) | (0.049) | (0.041) | (0.085) |
| Closing x Post x Specialization loss | -0.120** | -0.120** | -0.128** | -0.120** | -0.203** | -0.078 |
| | (0.060) | (0.060) | (0.059) | (0.059) | (0.080) | (0.105) |
| Closing x Post x Specialization gain | 0.042 | 0.042 | 0.021 | 0.019 | 0.021 | 0.208* |
| | (0.056) | (0.056) | (0.057) | (0.057) | (0.069) | (0.108) |
| Closing x Post x Δ distance | | -0.011 | | -0.009 | -0.039 | 0.089 |
| | | (0.028) | | (0.029) | (0.034) | (0.057) |
| Closing x Post x Low competition | | | -0.080*** | -0.070** | | |
| | | | (0.029) | (0.029) | | |
| Post x Long relationship | | | | -0.147*** | | |
| | | | | (0.034) | | |
| Branch specialization (MA over 4Q) | 0.043*** | 0.043*** | 0.043*** | 0.043*** | 0.034*** | 0.049*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.006) | (0.009) |
| Firm x Bank FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm x Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Banking Group x Quarter FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 | 1,994,875 | 1,403,186 |
| R-Square | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.91 |

**Note:** This table shows estimation level for regression (6). The sample period is Q1 2010 to Q3 2017. The dependent variable is the log amount of total credit outstanding (in euro thousands) at the firm-bank $i, b$ level, in quarter $t$ (including unused credit lines). *Closing* × *Post* is the 16-quarter period starting after the official date of branch closure. *Announcement* × *Post* is the 6-quarter period starting with the announcement of the branch closure and ending with the official branch closure. Δ *specialization* is the difference between the lagged level of specialization of the closing branch over 4 quarters (moving average) and the lagged level of specialization of the absorbing branch the quarter before the absorption. *Closing* × *Post* × *Specialization loss* indicates that the closing branch was specialized while the absorbing branch is not (Δ specialization >0). On the contrary, *Closing* × *Post* × *Specialization gain* indicates that the closing branch was not specialized while the absorbing branch is (Δ <0 ). *Urban Unit* denotes the urban unit of the location of the firm. Δ *distance* is a dummy variable equal to 1 if the closure triggers an increase in the firm-bank distance larger than 20 km, and -1 if the closure reduces the distance by more than 20 km. *Low competition* is a dummy equal to one if competition in the local credit market (measured in the UU of the absorbing branch) is below the median. *High competition* is a dummy equal to one if local bank competition is above the median. Long relationship is a dummy equal to one if the closure triggers the loss of a banking relationship of more than 3 years. Robust standard errors (clustered at the urban unit x year level) are in parentheses.

# A Online appendix - not for publication.

Table A.1: Branch closures, branch specialization and SMEs' access to credit: firm-bank level analysis (p90)

| | Total credit | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Announcement x Post | -0.072*** | -0.072*** | -0.070*** | -0.070*** | -0.071*** |
| | (0.016) | (0.016) | (0.016) | (0.016) | (0.016) |
| Announcement x Post x Δ specialization | | -0.025 | | -0.022 | |
| | | (0.040) | | (0.040) | |
| Closing x Post | -0.124*** | -0.123*** | -0.123*** | -0.122*** | -0.101*** |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.022) |
| Closing x Post x Δ specialization | | -0.078* | | -0.059 | |
| | | (0.043) | | (0.043) | |
| Closing x Post x Specialization loss | | | | | -0.136* |
| | | | | | (0.070) |
| Closing x Post x Specialization gain | | | | | 0.017 |
| | | | | | (0.050) |
| Branch specialization (MA over 4Q) | | | 0.043*** | 0.043*** | 0.043*** |
| | | | (0.004) | (0.004) | (0.004) |
| Firm x Bank FE | Yes | Yes | Yes | Yes | Yes |
| Firm x Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Banking Group x Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 |
| R-Square | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |

**Note:** This table shows estimation level for regression (6). A branch is specialized if:

$$S_{b,h,s,u,q} = \mathbb{I}(\hat{S}_{b,h,s,u,} \geq \text{p90}) \tag{7}$$

The sample period is Q1 2010 to Q3 2017. The dependent variable is the log amount of total credit outstanding (in euro thousands) at the firm-bank $i, b$ level, in quarter $t$ (including unused credit lines). *Closing* × *Post* is the 16-quarter period starting after the official date of branch closure. *Announcement* × *Post* is the 6-quarter period starting with the announcement of the branch closure and ending with the official branch closure. Δ *specialization* is the difference between the lagged level of specialization of the closing branch over 4 quarters (moving average) and the lagged level of specialization of the absorbing branch the quarter before the absorption. *Closing* × *Post* × *Specialization loss* indicates that the closing branch was specialized while the absorbing branch is not (Δ specialization = 1). On the contrary, *Closing* × *Post* × *Specialization gain* indicates that the closing branch was not specialized while the absorbing branch is (Δ specialization = -1). *Urban Unit* denotes the urban unit of the location of the firm. Robust standard errors (clustered at the urban unit x year level) are in parentheses.

Table A.2: Branch closures, branch specialization and SMEs' access to credit: firm-bank level analysis.(p75 +1.5 IQR)

| | Total credit | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Announcement x Post | -0.072*** | -0.072*** | -0.070*** | -0.070*** | -0.071*** |
| | (0.016) | (0.016) | (0.016) | (0.016) | (0.016) |
| Announcement x Post x Δ specialization | | -0.028 | | -0.023 | |
| | | (0.043) | | (0.043) | |
| Closing x Post | -0.124*** | -0.124*** | -0.123*** | -0.123*** | -0.089*** |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.021) |
| Closing x Post x Δ specialization | | -0.081* | | -0.056 | |
| | | (0.046) | | (0.046) | |
| Closing x Post x Specialization loss | | | | | -0.226*** |
| | | | | | (0.082) |
| Closing x Post x Specialization gain | | | | | -0.071 |
| | | | | | (0.050) |
| Branch specialization (MA over 4Q) | | | 0.043*** | 0.043*** | 0.043*** |
| | | | (0.004) | (0.005) | (0.005) |
| Firm x Bank FE | Yes | Yes | Yes | Yes | Yes |
| Firm x Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Banking Group x Quarter FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 | 3,931,732 |
| R-Square | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |

**Note:** This table shows estimation level for regression (6). A branch is specialized if:

$$S_{b,h,s,u,q} = \mathbb{I}(\hat{S}_{b,h,s,u,} \geq \text{p75} + 1.5 \text{ IQR}) \tag{8}$$

The sample period is Q1 2010 to Q3 2017. The dependent variable is the log amount of total credit outstanding (in euro thousands) at the firm-bank $i, b$ level, in quarter $t$ (including unused credit lines). *Closing* × *Post* is the 16-quarter period starting after the official date of branch closure. *Announcement* × *Post* is the 6-quarter period starting with the announcement of the branch closure and ending with the official branch closure. Δ *specialization* is the difference between the lagged level of specialization of the closing branch over 4 quarters (moving average) and the lagged level of specialization of the absorbing branch the quarter before the absorption. *Closing* × *Post* × *Specialization loss* indicates that the closing branch was specialized while the absorbing branch is not (Δ specialization = 1). On the contrary, *Closing* × *Post* × *Specialization gain* indicates that the closing branch was not specialized while the absorbing branch is (Δ specialization = -1). *Urban Unit* denotes the urban unit of the location of the firm. Robust standard errors (clustered at the urban unit x year level) are in parentheses.

Table A.3: Herfindhal Index at urban unit level

| | Mean | p10 | p25 | Median | p75 | p90 |
|---|---|---|---|---|---|---|
| HHI (Traditionnal manner) | 0.30 | 0.12 | 0.16 | 0.23 | 0.36 | 0.57 |
| HHI (w. avg. across industries) | 0.45 | 0.21 | 0.28 | 0.39 | 0.56 | 0.82 |

**Note:** This table shows two different measures of credit market concentration by urban unit, in 2016 Q4. The first Herfindahl Index (first line) is standard concentration measure, calculated using total lending shares. The second is the weighted average of credit concentrations calculated industry-by-industry (second line), which takes into account market segmentation.

Table A.4: What drives bank branch closures ? (1) ANOVA.

| | County FE (1) | Urban Unit FE (2) | Banking Group FE (3) | Bank FE (4) | (4) + County FE (5) | (4) + UU FE (6) |
|---|---|---|---|---|---|---|
| R-Square | 0.03 | 0.08 | 0.02 | 0.32 | 0.32 | 0.35 |
| Explained by Bank FE | | | | | 0.296 | 0.276 |
| Explained by County FE | | | | | 0.001 | |
| Explained by UU FE | | | | | | 0.042 |

**Note:** The sample is the population of bank branches active in our cleaned dataset. The dependent variable is a dummy equals to 1 if the branch is closed during the 2010-2017 period, and 0 if not. We run a partial analysis of variance (ANOVA; Fixed-effect model class I) sequentially adding bank, banking group, department and urban unit fixed-effects. We report the $R^2$ and the share of variance explained by each category

Table A.5: What drives bank branch closures ? (2) Linear probability model (department level).

| | $\mathbb{P}$ (Branch closure over the period 2010-2017) | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bank branch size (Total Loan) | 0.002*** | | | 0.002 | 0.002 | 0.003 |
| | (0.001) | | | (0.002) | (0.002) | (0.002) |
| Market share (Branch total loan / County total loan) | -0.033 | | | -0.033 | -0.006 | -0.022 |
| | (0.050) | | | (0.052) | (0.052) | (0.047) |
| Dummy (Only branch of the bank in the county) | -0.018** | | | -0.018* | -0.021** | 0.006 |
| | (0.009) | | | (0.010) | (0.010) | (0.011) |
| Branch rank in the bank x county | | -0.006 | | 0.002 | 0.009 | -0.016 |
| | | (0.010) | | (0.011) | (0.011) | (0.010) |
| Branch rank in the bank | | -0.005 | | -0.002 | -0.009 | 0.024* |
| | | (0.010) | | (0.013) | (0.013) | (0.014) |
| County size (Population) | | | 0.006*** | | 0.007*** | 0.001 |
| | | | (0.002) | | (0.002) | (0.002) |
| County size variation: 1990-2006 | | | 0.053*** | | 0.057*** | -0.009 |
| | | | (0.016) | | (0.016) | (0.016) |
| Banking Group FE | ✓ | ✓ | ✓ | ✓ | ✓ | × |
| Bank FE | × | × | × | × | × | ✓ |
| Observations | 15863 | 16084 | 16084 | 15863 | 15863 | 15722 |
| R-Square | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.31 |

**Note:** The sample is the population of bank branches active in our cleaned dataset. The dependent variable is a dummy equals to 1 if the branch is closed during the 2010-2017 period, and 0 if not. We run a linear probability model with all our explanatory variables measured before the period of interest (i.e. in 2008 or 2009 for branch-level variables and 2006 for department level variables -taken from the French Census-). The *rank* of a branch is the rank of the branch (with respect to its size) within the department or within the department and the bank. It is equal to 1 if the branch is the largest in the department (respectively department x bank) and to N if the branch is the smallest of N branches located in this department (respectively department x bank). Total credit and population are in log.

Table A.6: What drives bank branch closures ? Linear probability model (Urban unit level).

| | $\mathbb{P}$ (Branch closure over the period 2010-2017) | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Bank branch size (Total Loan) | 0.001** | | | 0.002 | 0.002 | -0.000 |
| | (0.001) | | | (0.001) | (0.001) | (0.002) |
| Market share (Branch total loan / UU total loan) | 0.001 | | | -0.001 | -0.001 | 0.019*** |
| | (0.007) | | | (0.007) | (0.007) | (0.006) |
| Dummy (Only branch of the bank in the UU ) | -0.018*** | | | -0.023*** | -0.023*** | -0.024*** |
| | (0.003) | | | (0.005) | (0.005) | (0.004) |
| Branch rank in the bank x UU | | -0.019*** | | 0.011 | 0.012 | -0.001 |
| | | (0.005) | | (0.007) | (0.008) | (0.006) |
| Branch rank in the bank | | 0.004 | | -0.005 | -0.005 | -0.007 |
| | | (0.005) | | (0.009) | (0.009) | (0.012) |
| UU size (Population) | | | 0.003*** | | 0.000 | -0.003*** |
| | | | (0.001) | | (0.001) | (0.001) |
| UU size variation: 1990-2006 | | | 0.005 | | 0.006 | -0.004 |
| | | | (0.005) | | (0.005) | (0.005) |
| Banking Group FE | ✓ | ✓ | ✓ | ✓ | ✓ | × |
| Bank FE | × | × | × | × | × | ✓ |
| Observations | 15,863 | 16,084 | 16,084 | 15,863 | 15,863 | 15,722 |
| R-Square | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.32 |

**Note:** The level of observation is a bank branch. The sample is the entire population of bank branches active in our final sample. The dependent variable is a dummy equals to 1 if the branch undergoes a closure during the 2010-2017 period, and 0 if not. We run a linear probability model with all our explanatory variables measured before the period of interest (i.e. in 2008 or 2009 for branch-level variables and 2006 for urban-unit level variables). The branch rank measure the position of the branch (with respect to its size) within the urban unit or within the urban unit and the bank. The rank is equal to 1 if the branch is the largest one in the urban unit (respectively urban unit x bank) and to N if the branch is the smallest of N branches located in this urban unit (respectively urban unit x bank). Total credit and population are in log.

Table A.7: Specialization, bank-firm distance and bank branch closures.

| | Mean | Min | p5 | p25 | Median | p75 | p95 | Max |
|---|---|---|---|---|---|---|---|---|
| $\Delta$ specialization | 0.1 | -1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 |
| $\Delta$ distance (km) | 23.1 | -470.8 | -22.7 | 2.4 | 16.0 | 42.2 | 76.2 | 379.7 |

**Note:** For each branch closing occurring between Q1 2010 and Q3 2017, we compute $\Delta$ spec. as the level of specialization of the closing branch minus the level of specialization of the absorbing branch, i.e. $\Delta$ spec. $= S_{b,s,u} - S_{b',s,u}$ where branch $b$ is the closing one and branch $b'$ the absorbing one (see 4.1). By definition, $\Delta$ spec. lies between -1 and 1. Similarly, we compute $\Delta$ distance as the distance from the closing branch minus the distance from the absorbing one, in km.